

WHAT IS CLAIMED IS:

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1. A method of simulating connection characteristics of a network, comprising:

5 providing a driver capable of accessing a stream of network packets;

calculating a send time for each of the network packets;

sequencing the network packets in a queue until the respective send times to simulate a desired propagation connection

10 characteristic;

altering the stream of network packets to simulate an additional connection characteristic of the network.

2. The method of claim 1, wherein the propagation connection  
15 characteristic is at least one of: (a) bandwidth; (b) transmission delay.

3. The method of claim 2, wherein the additional connection  
characteristic of the network is at least one of: (a) loss of a network  
packet; (b) fragmentation of a network packet; (c) reordering of at least  
20 two network packets; (d) duplication of a network packet; (e) network  
address translation of a network packet having an original network  
address.

4. The method of claim 2, wherein simulating a desired  
25 bandwidth comprises:  
determining a length of a network packet;  
calculating the send time for the network packet using the  
network packet length to simulate the desired bandwidth.

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5. The method of claim 2, wherein simulating a desired transmission delay comprises adding the desired transmission delay to the send time.

5 6. The method of claim 3, wherein altering the stream of network packets to simulate the network address translation of the network packet comprises:

generating a simulated network address for each new connection; and

10 mapping the original network address to the simulated network address for each network packet.

7. The method of claim 6, wherein the simulated network address is generated randomly.

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8. The method of claim 3, wherein altering the stream of network packets to simulate the loss of a network packet comprises:

determining a packet dropping frequency; and

deleting the network packet at the packet dropping frequency.

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9. The method of claim 3, wherein altering the stream of network packets to simulate the fragmentation of the network packet comprises:

determining a packet fragmentation frequency;

separating the network packet into a plurality of new network

25 packets at the packet fragmentation frequency;

dividing data contained in the network packet; and

distributed the divided data between the new network packets.

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10. The method of claim 9, further comprising creating headers for the new network packets.

11. The method of claim 9, wherein the divided data is distributed  
5 disproportionately between the new network packets.

12. The method of claim 3, wherein altering the stream of network packets to simulate the reordering of at least two network packet  
comprises:

10 determining a packet reordering frequency; and  
changing an order of the at least two network packets within  
the network packet stream at the packet reordering frequency.

13. The method of claim 3, wherein altering the stream of network  
15 packets to simulate the duplication of the network packet comprises:  
determining a packet duplication frequency; and  
generating a copy of the network packet at the packet  
duplication frequency.

20 14. The method of claim 2, wherein altering the stream of network packets comprises changing a network address of each client connection.

15. The method of claim 1, wherein the driver is implemented in  
an intermediate layer between an upper layer and a lower layer.

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16. The method of claim 15, wherein the upper layer processes the network packets and the lower layer places the network packets onto a physical media of the network.

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17. A method of altering a network packet having an original network address, comprising:  
providing a driver capable of accessing a stream of network packets;  
5 mapping the original network address to a simulated network address to create an address-modified network packet; and  
modifying an additional connection characteristic of the stream of network packets.

10 18. The method of claim 17, wherein the mapping is performed using a two-way mapping table.

19. The method of claim 18, wherein the two-way mapping table is a two-way hash table.

15 20. The method of claim 19, wherein the mapping uses a two-way output hash table, a two-way input hash table and a hash information repository.

20 21. The method of claim 18, wherein the mapping uses a two-way output mapping table if the network packet is being transmitted and a two-way input mapping table if the network packet is being received.

22. The method of claim 17, wherein the additional connection characteristic is at least one of: (a) packet loss; (b) packet fragmentation;  
25 (c) packet reordering; (d) packet duplication; (e) bandwidth limitation; (f) transmission delay.

23. A network simulation system, comprising:

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a modification module capable of accessing a network packet,  
comprising:

an addressing module that replaces an original network  
address of a network packet with a simulated network address; and  
5 a propagation module that alters a propagation  
connection characteristic of the network packet.

24. The network simulation system of claim 23, wherein the  
propagation connection characteristic is at least one of: (a) bandwidth; (b)  
10 transmission delay.

25. The network simulation system of claim 23, wherein the  
addressing module further comprises a two-way mapping table that maps  
the original network address to the simulated network address.  
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26. The network simulation system of claim 23, wherein the  
modification module further comprises a sequence module that alters a  
second connection characteristic of the network packet.

20 27. The network simulation system of claim 26, wherein the  
second connection characteristic is at least one of: (a) packet dropping;  
(b) packet fragmentation; (c) packet duplication; (d) packet reordering.

27. The network simulation system of claim 23, further comprising  
25 a queue module that stores the network packet for a period of time.

28. The network simulation system of claim 27, wherein the  
packet queue includes an input queue that stores the network packet if the

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